Amendments to the Specification:

Please insert the following text after the heading "BRIEF DESCRIPTION OF THE DRAWINGS" on page 3, line 20:

FIG. 1A is a semi-schematic cross-sectional view of a PWB in accordance with the present invention including two electrically conductive laminates that are connected to other layers of the PWB via lined through holes;

FIG. 1B is a flow chart illustrating a process for manufacturing PWBs in accordance with the present invention;

Please insert the following text after the heading "DETAILED DESCRIPTION OF THE INVENTION" on page 5 line 16 and before the paragraph on page 5 line 17 that starts "Referring now to the drawings":

Referring now to the drawings, a printed wiring board ("PWB") 10a in accordance with an embodiment of the present invention is shown in FIG. 1A. The PWB includes a first laminate 120, and a second laminate 122, multiple layers of prepreg 124 and multiple layers of metal 126. The PWB 10a contains circuits and is used for mounting integrated circuits (ICs) and components. The term circuit is used to describe an electrically conductive path between two or more points. Individual layers of the PWB can include circuits and a number of circuits on several layers of the PWB can be connected to create an overall PWB circuit. The layers on which circuits are located are often referred to as functional layers.

The laminates 120 and 122 comprise a carbon containing layer 14 sandwiched between a first layer of metal or other electrically conductive material 16 and a second layer of metal or other electrically conductive material 18. Both of the laminates 120 and 122 are electrically conductive, which enables the laminate to be used as a functional layer within the PWB. The functions that can be performed by the laminates include acting as a ground plane within the PWB, a power plane within a PWB or both a ground and power plane in the PWB where routing is used to electrically isolate portions of the laminate. Various examples of other laminate structures that can be used in accordance with the present invention to implement the laminates 120 and 122 are discussed below.

The layers of metal can act as functional layers in the PWB. In one embodiment, the layers of metal or other electrically conductive material are patterned with electrical circuits. Electrical contact between the various layers of metal or laminates can result in the functions of the electrical circuits patterned onto the layers of metal being interrupted. Therefore, prepregs are used to electrically insulate the electrically conductive laminates 120 and 122 and the layers of metal 126.

A prepreg is a composite layer that includes a substrate or supporting material composed of fibrous material that is impregnated with resin. The prepregs are electrical insulators having dielectric constants less than 6.0 at 1 MHz. A prepreg may also be a film. A film is a type of prepreg that does not include a substrate but is instead a composite that only includes resins. Materials that can be used to construct prepregs in accordance with the present invention are discussed below.

Often, the circuits within a PWB include plated "through holes" to establish connections between the functional layers of the PWB. In one embodiment, the PWB 10a includes through holes

130 lined with electrically conductive material that are used to establish electrical connections between the functional layers in the PWB. These lined through holes enable electrical signals to pass between circuits on the metal layers and/or the laminates. It is well known in the art that connections can be created between the electrically conductive linings of plated through holes and circuits patterned on a layer of metal by locating the plated through hole such that the lining of the plated through hole contacts a portion of the circuit patterned on the layer of metal. When a connection between a laminate and a plated through hole is desired, the through hole is simply drilled through the laminate at the desired location and an electrical connection is established where the electrically conductive lining of the through hole contacts the electrically conductive laminate.

Techniques for avoiding electrical connections between circuits patterned on a layer of metal in a PWB and a plated through hole are well known in the art. Each of the options essentially involves designing the circuit routings and the locations of the plated through holes to avoid contact between the electrically conductive lining of the plated through hole and the circuit. Where connections between the plated through holes and the first or second laminates are not desired, then an annulus of dielectric material 132 such as an epoxy resin with a dielectric constant less than 6.0 at 1 MHz can be used to ensure that an electrical connection does not exist between the laminate and the electrically conductive lining of the through hole.

A process in accordance with the present invention for manufacturing the PWB 10a illustrated in FIG. 1A is shown in FIG. 1B. The process 150 commences with the step 152, which involves constructing two laminates in accordance with the present invention using any of the appropriate processes described below

including the process illustrated in FIG. 2A. Power or ground regions are then patterned on the laminates in the step 154.

Once the patterning is complete, the laminates are subjected to oxide treatment in the step 156. After oxide treatment, clearance hole drilling is performed in the step 158. Clearance hole drilling involves drilling holes in the laminate of a first diameter and filling the resulting holes with a dielectric material such as any of the resins described below with a dielectric constant less than 6.0 at 1 MHz. Prior to filling the drilled holes, they are inspected and cleaned using high pressure dry air.

Once the clearance holes have been drilled, the second lamination cycle is performed in the step 160. The second lamination cycle is similar to the second lamination cycle described below in relation to FIG. 2A. After the second lamination cycle, circuits are etched onto the layers of metal that will be located within the interior of the finished PWB are patterned in the step 166 and then subjected to oxide treatment in the step 168.

Following the oxide treatment, the third lamination step is performed in the step 170. The third lamination involves aligning the two structures produced in the second lamination with additional prepreg layers to correspond with the layers of the PWB 10a illustrated in FIG. 1A. The layers are then exposed to temperatures and pressures similar to those experienced during the second lamination cycle.

After the third lamination cycle, the final through hole drilling is performed in step 172. The final through hole drilling involves drilling holes through the entire PWB that have a second diameter, which is less than the first diameter described above. The through holes are then lined in the step 174. Preferably, the through holes are lined with copper. In

other embodiments, the through holes can be plated with materials similar to those that can be used in the construction of the layers of metal. If a through hole passes through one of the filled clearance holes in a laminate, then the lining of the through holes are electrically isolated from the laminate in which the clearance hole is drilled. If a through hole does not pass through one of the filled clearance holes in a laminate, then the lining of the through holes is in electrical contact with the laminate.

Please replace the paragraph beginning at page 5, line 17, which starts with "Referring now to the drawings, FIGURE 1" with the following amended paragraph:

~~Referring now to the drawings, FIGURE 1 illustrates a~~ A lightweight multiple-layer PWB in accordance with the present invention is illustrated in FIGURE 1. The PWB 10 includes a laminate 12 comprising a carbon containing layer 14 sandwiched between a first layer of metal or other electrically conductive material 16 and a second layer of metal or other electrically conductive material 18. The laminate is sandwiched between a first layer of prepreg 20 and a second layer of prepreg 22. The top layer of the PWB is constructed from a third layer of metal or other electrically conductive material 24. The bottom layer of the PWB is constructed using a fourth layer of metal or other electrically conductive material 26. As set forth below, the electrically conductive layers 16, 18, 24 and 26, and the corresponding layers of the other embodiments described herein, may be made of metal or any of a variety of metal-containing compositions having suitable properties of electrical conduction. For convenience, however, these layers often will be referred to herein simply as "metal" layers.